Review: Screening tests are not as accurate as overnight polysomography for the diagnosis of adult sleep apnea

Ross SD, Allen IE, Harrison KJ, et al. **Systematic review of the literature regarding the diagnosis of sleep apnea.** Evidence Report/Technology Assessment No. 1. (Prepared by MetaWorks Inc. under contract no. 290-97-0016.) AHCPR publication no. 99-E002. Rockville, MD: Agency for Health Care Policy and Research; February 1999.

QUESTION

How do the accuracies of diagnostic and screening tests (radiologic imaging, laboratory assays, partial-night polysomnography [PSG], daytime PSG, reduced-channel PSG, and clinical signs and symptoms) compare with overnight sleep laboratory PSG for identifying sleep apnea in adults?

DATA SOURCES

Studies were identified by searching MEDLINE (1980 to November 1997) and *Current Contents* (1997) using the terms sleep apnea syndrome; monitoring, physiologic; airway resistance; and index. Bibliographies were scanned.

STUDY SELECTION

English-, French-, German-, Spanish-, and Italian-language studies were selected if a diagnostic test or intervention was used to support a diagnosis of sleep apnea and ≥ 10 adults with any form of sleep apnea were studied. Studies of patients with other potentially confounding diseases were excluded.

DATA EXTRACTION

Data were extracted on study quality and description, patient and test characteristics, and results.

MAIN RESULTS

71 studies (7572 participants) compared overnight PSG (diagnostic standard) with portable monitoring devices (25 studies), reduced-channel PSGs (3 studies), daytime PSGs (3 studies) partial-night PSGs (4 studies), oximetry (12 studies), radiologic tests (5 studies), clinical measures (17 studies), chemical assay (1 study), questionnaires (3 studies), and multivariate models (8 studies). Sensitivity and specificity for the tests vary (Table).

CONCLUSION

Screening tests are not as accurate as overnight polysomnography for diagnosing sleep apnea in adults.

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Diagnostic and screening tests for sleep apnea in adults using overnight laboratory polysomnography (PSG) as the diagnostic standard*

Tests	Weighted sensitivity	Weighted specificity	+LR	–LR
Oximetry	87%	65%	2.5	0.2
Partial-night PSG	42% to 93%†	70% to 100%†	—	—
Daytime PSG	66% to 100%†	50% to 100%†	—	—
Reduced-channel PSG	82% to 94%†	82% to 100%†	—	—
FEF_{50}/FIF_{50}	20%	79%	1.0	1.0
Sawtooth sign	62%	63%	1.7	0.6
FEF_{50}/FIF_{50} and sawtooth sign	39%	61%	1.0	1.0
Global impression	59%	66%	1.7	0.6
Prediction equations	67%	89%	6.1	0.4

*FEF_{50}/FIF_{50} = measure of extrathoracic airway obstruction. LRs defined in Glossary and calculated from data in article.
†Unweighted data.

COMMENTARY

The review by Ross and colleagues attempts to determine whether sleep studies without electrophysiologic monitoring of sleep are clinically useful. It includes a serious methodologic flaw: Polysomnography is used as the diagnostic standard, but no evidence has shown that it is such. Polysomnography became accepted as the usual standard for diagnosing sleep apnea in North America, but this conclusion was not evidence based. Studies that have attempted to determine whether electrophysiologic monitoring adds to the accuracy of diagnosing sleep apnea have found that it does not (1). Further, electrophysiologic variables are not the best predictors of improvement with therapy (2).

Despite this flaw, the review is useful because it shows the lack of agreement between diagnostic techniques and highlights the need for more carefully done studies. If the major clinical conclusion of the review is reduced to the statement that no severely symptomatic patient should have the diagnosis excluded on the basis of a negative limited sleep study, then I believe this is a reasonable, although not evidence-based, statement. The finding of a pristine sleep and breathing pattern in all postures in a patient who is known to be asleep remains the best excluder of sleep apnea. This belief has been reinforced by evidence from randomized controlled trials of continuous positive airway pressure (CPAP) therapy showing that large placebo responses can be obtained in patients with sleep apnea (3, 4). Thus, a response to a trial of CPAP cannot be used as evidence of disease, despite recent trends in this direction.

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References

1. **Douglas NJ, Thomas S, Jan MA.** Lancet. 1992;339:347-50.
2. **Bennett LS, Langford BA, Stradling JR, Davies RJ.** Am J Respir Crit Care Med. 1998;158:778-86.
3. **Engleman HM, Kingshott RN, Wraith PK, et al.** Am J Respir Crit Care Med. 1999;159:461-7.
4. **Jenkinson C, Davies RJ, Mullins R, Stradling JR.** Lancet. 1999; 353:2100-5.